Robo-Mate

Project Factsheet

# Robo-Mate

## Intelligent exoskeleton based on human-robot interaction for manipulation of heavy goods in Europe's factories of the future

## Background

In Europe's industry and industrial manufacturing processes, manual material handling is one of the most frequent operations: Components in packages are distributed to the manufacturing sites by trucks, moved from trucks to the store by forklift and then from the store to the assembly line side. On the assembly line, packages are removed and single components are moved to the assembling operations. This material handling is carried out by workers before starting the manual assembling operations in order to move components from the assembly line side to the workplace. In general, manual material handling should only be performed if the task is considered safe through an ergonomics evaluation. In production lines high frequency lifting of loads as low as 3 kg can cause injury. For frequent lifting of loads over 3 kg, a manipulator for lifting and positioning is required. In many areas of manufacturing and service industry, such as automotive production, foods processing, electronics, and logistics, the weight of components often ranges from 5 kg to 15-20 kg.

Workplace injuries cost European societies up to 4% of GNP. Over 25% of Europeans experience back injury due to work. Robots are traditionally inflexible to use for many manual handling tasks. The world robotics market is set to double to $66Bn pa in the next 15 years. Europe could corner the industrial collaborative human-robotic part of that market (currently Asia). (Source: Forge, Simon; Blackman, Colin: A Helping Hand for Europe: The Competitive Outlook for the EU Robotics Industry, Luxembourg 2010.)

## Objectives

The goal of Robo-Mate is to develop a user-friendly intelligent co-operative light weight wearable human-robotic exoskeleton for manual handling work in different industries. The device will be deployable within half a day and will not require task specific programming. The newly developed exoskeleton will be highly flexible and used directly in craft or mass production or in auxiliary processes.

Drawing from experience with industrial manipulators and industrial robot systems, the project aims at combining flexibility and easy-to-access human-centred control with the endurance, precision and sensor-based guidance of a robot. The main idea is to provide workers with an intelligent tool, enabling them to increase productivity and decrease physical stress, or even injury, by using their natural senses and movements without needing to have specialized training on robot systems and programming languages.

**Funding Programme:**

SEVENTH FRAMEWORK PROGRAMME

7th Framework Programme of the European Union (FP7)

**Project Duration:**
01/09/2013 – 30/11/2016

**Project Budget:**
4.5 million euro

**Project Website:**
www.fp7-robomate.eu

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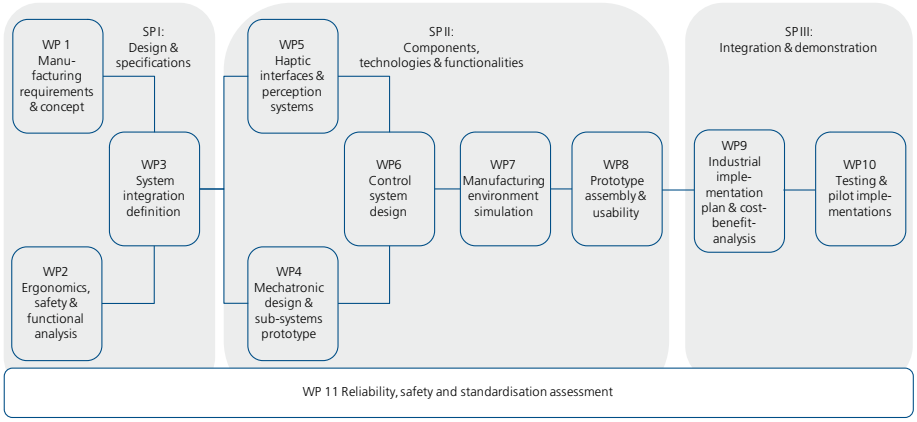
## Activities

The Robo-Mate project is a 39-month programme. The above-mentioned objectives will be achieved through user-friendly methods of interaction with, and the tasking of, intelligent cooperative robotic systems and through robotics-enabled production processes. For this reason, the work packages (WPs) reflect the development of the exoskeleton and its deployment in different industrial environments. As the process involves substantial and large-scale development and includes partners from different sectors and industries, the WPs are aggregated into 3 sub-projects (SPs), reflecting the complexity and the multidisciplinary of this project.




## Impact

The powered exoskeleton developed within the Robo-Mate project will establish a smart new form of human-robot interactive cooperation in industrial environments. As a cost-effective and flexible solution it will extend the range of robotics applications in industrial processes and it will increase productivity of human workers. At the same time it will reduce health risks related to physically demanding tasks and will thus contribute to equal opportunities on the shopfloor.

Specifically, Robo-Mate will have the following impacts:

- Increasing use of robot installations in manufacturing. Today, only some 15% of robot automation potential is being exploited. Further improvement in robot ex-ploitation will contribute to higher employment as more manufacturing capacity will remain in Europe.
- Increasing adaptability of advanced factories by combining the flexibility inherent to humans with the enhanced potential of cooperative production systems, main-taining reduced investment costs and allowing a wide use of those systems in new production areas and sectors, particularly SMEs.
- Promotion of equal opportunities on the shopfloor in terms of gender, age and skills, due to less physically demanding jobs in manufacturing and improved working environment and including accessibility for programming and use.

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